McCloud Community Services District
Attachment 3 – Work Plan

Description of the Project:

McCloud Community Services District ("MCSD" or "District") operates the water supply for the town of McCloud, CA. The District is served by three water sources originating from the base of Mt. Shasta: Intake Spring, Upper Elk Spring and Lower Elk Spring. A newly constructed, 14-inch ductile iron pipe transmits water from Intake Spring head works to a pressure relief and metering station located to the north of two tanks - - a new, covered 1.2 million gallon (MG) tank and a 1 MG uncovered tank. The Elk Spring pipeline also feeds the tanks. Flows to the tank site are either routed to the town for consumption or spilled into Squaw Creek, located immediately to the east of the tanks.

Comment [MCS1]: Wayne - Im sure there is a very good description of McCloud and the history of the mill leading to the present day. I'd harp on the fact that the only source of revenue for the town was the Mill that has been shut down since the 1980s. (e.g. Disadvantaged Community)

This proposed project is to replace an existing historic wooden pipe with a new 16-inch high-pressure pipeline and develop a 440 kW hydroelectric project. The water conveyance from the new tanks into the town is a 120-year old redwood stave pipe that dates back to the turn of the 20th Century, when there was a lumber mill in the town. Over the past century, the redwood stave pipe has been broken and repaired, is open to atmosphere at some points and leaks excessively when charged with water. Figure 1 shows a repaired section of the wooden pipe that is exposed to atmosphere with numerous holes perforating the conveyance.

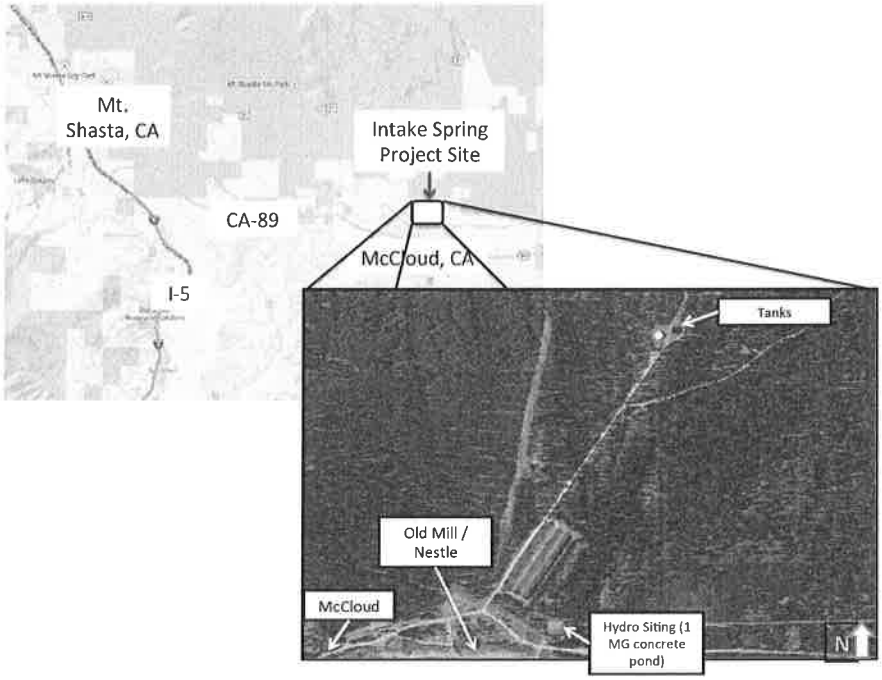
Comment [MCS2]: Wayne – please verify

Comment [MCS3]: Wayne – what is the type of wire that the redwood stave pipe wrapped with? Lead? Copper?

Figure 1: Existing Wood Pipeline

The implementation of the new pipe will save significant water from leakage and enable MCSD to develop a hydroelectric project that is estimated to generate more that 2,900,000 kilowatt-hours of renewable energy annually, which is the equivalent reduction of 2,000 metric tons of greenhouse gases or 275 homes electricity use for one year. [1] The new pipe is estimated to save between 68,000,000 MG/yr to 95,000,000 MG/yr (210 Acre ft to 290 Acre ft).

Figure 2: MCSD System Map



Project Proponent/Partner:

McCloud Community Services District hired NLine Energy Inc to perform a preliminary analysis report (pre-design report) for the project. NLine Energy is a full-service developer, integrator and financier of small hydropower projects, primarily focusing on projects less than 30 megawatts (MW) in size. NLine Energy is the approved small hydropower provider for the Association of California Water Agencies (ACWA).

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[1] http://www.epa.gov/cleanenergy/energy-resources/calculator.html

Task 1: Direct Project Administration and Reporting:

MCSD staff will be responsible for ensuring the project is in compliance with the grant agreement guidelines. During the project the project manger will manage all aspects of the project including ensuring the project stays on time and within budget. Weekly project meeting will be help with all project stakeholders to go over various aspects of the project. Monthly project reports will be provided displaying both progress from completion of task and amount of budget spent. The project will be managed and reviewed based on the following major milestones.

- California Environmental Quality Act (CEQA)
- Design
- Interconnection Application
- Federal Energy Regulatory Commission (FERC) Notice of Intent (NOI) Application
- Interconnection Agreement
- Bid Documents
- Begin Construction
- Commissioning and Permission to Operate

All monthly progress reports as well as the 50-percent Design Report, CEQA, FERC NOI, Final Design, Bid Docs and Interconnection Agreement will be available as supporting documentation for the grant.

Task 2: Easement(s):

McCloud Community Services District must show site control of the hydroelectric facility and associated area for the California Energy Commission renewable generator designation. Site control can be accomplished through fee simple ownership or permanent easement with hydropower rights explicitly expressed in the easement language. MCSD intends to obtain fee simple ownership of the site. Discussions with MCSD staff indicate one acre could be procured at a cost of $3,000 to $5,000, which has been included into the project cost estimates (budget).

Task 3. Project Evaluation/Design/Engineering:

MCSD hired NLine Energy Inc, to perform a preliminary analysis or pre-design for the new pipe and hydroelectric project. The intent of the analysis was to determine if the potential project possesses the technical, regulatory, environmental and financial merit worthy of development. This report is available upon request.

Initial Project Design and Site Location

The proposed hydroelectric project is located adjacent to the 1 MG concrete pond, located north of the Old Mill / Nestle property. The footprint of this powerhouse would be approximately 18 feet by 18 feet with 10 feet or 12 feet sidewalls. The structure would be made from pre-cast concrete and the foundation and flow control structure would be poured- in-place concrete. The flow control structure would be designed to dissipate the energy of water during load rejection (loss of utility power) events. The powerhouse would discharge directly into the 1 MG pond that would dump into Squaw Creek.

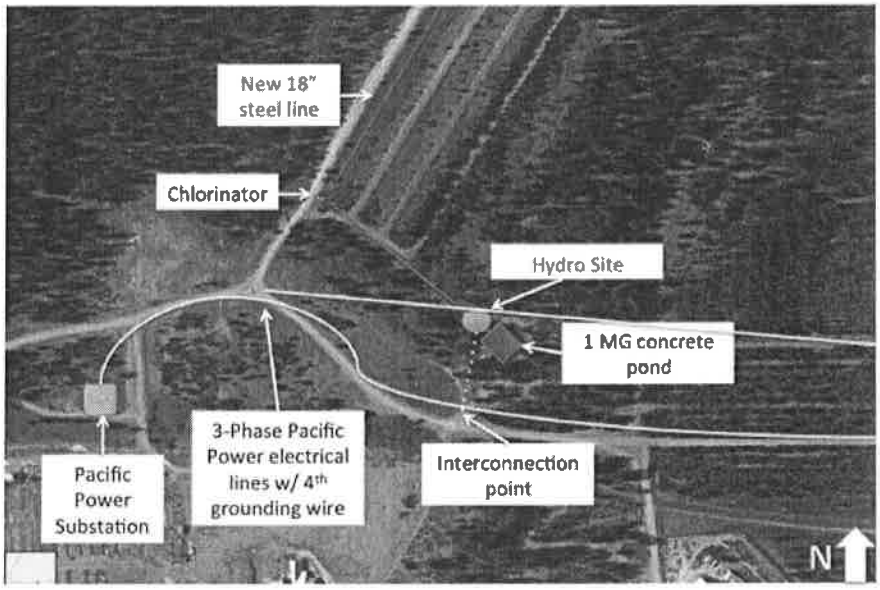
Flows to the powerhouse would be controlled through a 10-inch blow-off valve located at the Intake Spring head works allowing for consistent flows through the turbine. Flows in excess of the turbine capacity will be routed to Squaw Creek at the head works. Near the existing pressure relief and metering vault, flows will be diverted off the high-pressure side of the Intake Spring pipeline through a "Y" just downstream of the existing pressure relief vault. A Pelton turbine will utilize the flow and pressure to generate mechanical energy to power the electric generator. The turbine will take all the energy available and reduce the pressure to atmospheric pressure. The water will exit the turbine downward into a chamber in the floor of the powerhouse and flow by gravity into the flow control structure. The flow will then re-enter the Intake spring pipeline at low pressure to be routed to the covered 1.2 MG tank or diverted to the 24-inch pipeline that dumps into Squaw Creek

Water flow entering the Pelton turbine is controlled through nozzles (needle nozzles) that constrict the flow before it hits the runner. For this application, a single-nozzle machine is proposed. As flow requirements and resulting head conditions change, the flow through the nozzle is changed to compensate. An induction generator operating at constant speed will be used. Electronic controls will increase or decrease load to the generator in coordination with the flow control nozzle to ensure constant speed of the generator.

If load rejection occurs (loss of electrical power to the grid), the nozzle jet is deflected away from the runner in order to minimize runaway speed while the turbine control valve slowly closes. This valve closure will be communicated to the existing pressure relief valve, which will be plumbed into the downstream 14-inch pipeline, so they will act in concert to minimize pressure surge.

Figure 3 displays the overall site location and a view of where the new steel pipe will be installed and where the new hydroelectric site is located.

Figure 3: Site Layout



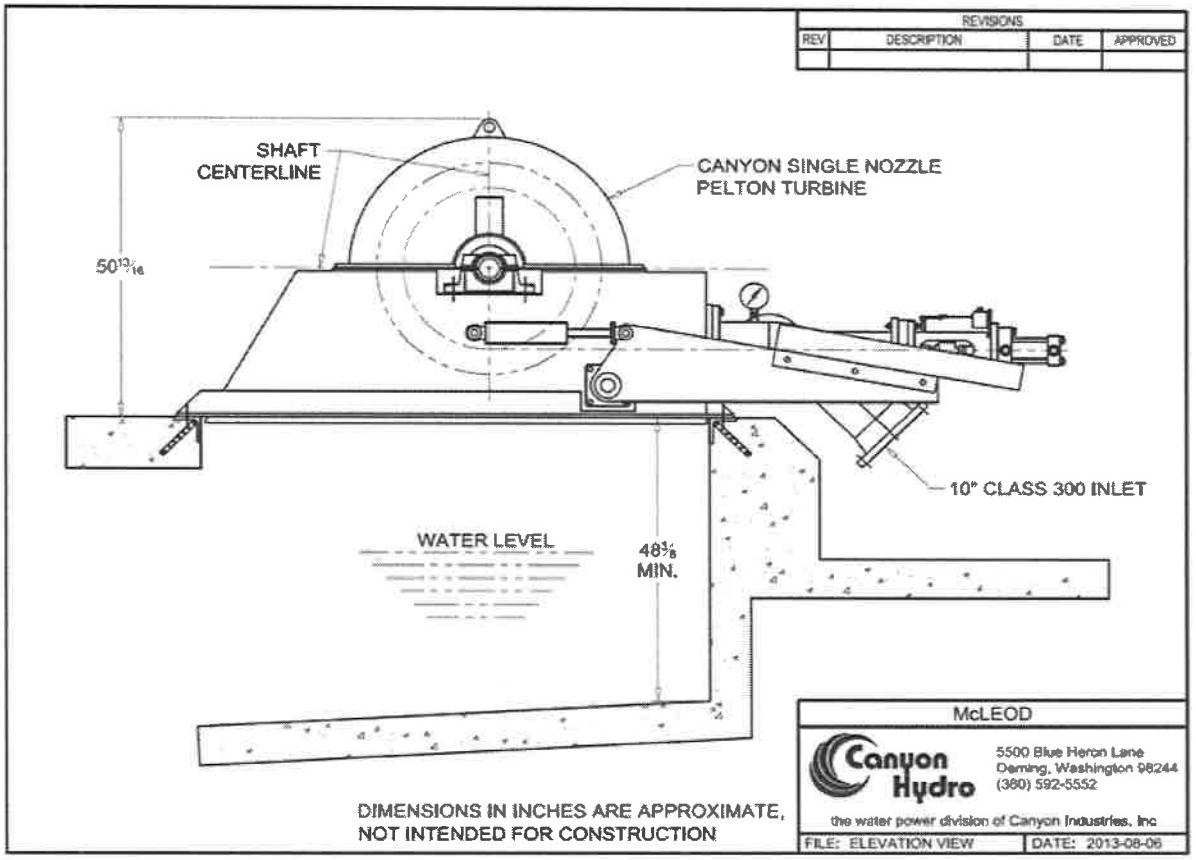
Turbine Selection

Based on the head, flow and an analysis of turbine costs relative to the potential revenue generated, NLine Energy determined that a Pelton turbine is the most applicable technology.

Pelton turbines are an impulse-style of hydroelectric turbine. Impulse turbines change the velocity of a water jet. The jet pushes on the turbine's curved blades, which changes the direction of the flow. The resulting change in momentum (impulse) causes a force on the turbine blades. Once the turbine is spinning, the force acts through a distance (work) and the diverted water flow is left with diminished energy. Prior to hitting the turbine blades, the water's pressure (potential energy) is converted to kinetic energy by a nozzle and focused on the turbine. No pressure change occurs at the turbine blades, and the turbine doesn't require a pressurized-housing for operation.

For this site a single nozzle Pelton turbine was selected as it process the entire range of pressure and flow for the site. A quote from the manufacturer was obtained for the entire equipment package including, turbine, generator, switchgear and control panel. The following figure displays a high level representation for this unit.

Figure 4: Single Nozzle Pelton Turbine configuration



An interconnection to Pacific Power's distribution grid is required in order to export power. The PacifiCorp interconnection process for Qualifying Facilities takes about a year to go through. The interconnection study process takes approximately six months and costs between $35,000 and $50,000. The following table illustrates the processing time, deposit fee and total cost by study step. These costs are included in the project estimate (budget).

Table 1: Pacific Power Interconnection Process and Study Costs

MCSD Intake Spring - PacifiCorp Interconnection Study Costs			
	Feasibility Assessment	System Impact Study	Facility Study
Processing Time	30 business days	45 business days	45 business days
Study Deposit	$1,000	$15,000	$25,000
Total Study Cost Estimate	$5,000-10,000	$10,000 - 15,000	$20,000-$25,000

The following schedule provides the anticipated completion dates for the Design & Engineering Milestones.

- Preliminary Analysis Report – Completed January 2014
- 50% Design Report = September 2015
- Interconnection Process Complete = April 2016
- 100% Design, Plans & Bid Documents = April 2016

Task 4: Environmental Documentation:

There are multiple federal, state, and local permits and licenses that must be obtained from various agencies before construction.

CEQA Analysis

Comment [MCS4]: A biological assessment has been completed - - Wayne –pls verify

This project is located near the 1-MG concrete pond. As a public agency, the District will need to comply with the provisions of CEQA.

The proposed project site is located on land that has been previously disturbed through construction of the Intake Spring pipeline or as use as a log deck and staging area when the mill was in operation. While there still may be biological resources involved, it is unlikely that impacts to biological resources would be significant.

PMC2 assesses that an initial study and a mitigated negative declaration (IS/MND) would be sufficient to enable the construction and operation of the power generation facilities. To support the IS/MND, a technical study for biology, air quality and greenhouse gas emissions would be conducted. Overall, the scope of the IS/MND would be basic and would focus on the environmental impacts from construction of the facility, as operations would have little impact to the environment. Important to the analysis will be the consideration of the entire extent of the project, including the power lines. For purposes of this discussion, we have assumed that all power lines would occur using existing poles and/or within an existing power line easement. The technical study estimates might increase if additional area must be evaluated. The following describes the focus of the technical studies.

- **Air Quality** - While the facility will have few air quality impacts during operation, construction will involve dust, construction vehicles, etc., that must be analyzed. It is unlikely that impacts to air quality from construction or operation would be significant; however, the analysis will need to provide evidence by reporting the results of the latest air quality models. Note that the IS/MND is likely to lead to standard mitigation measures for dust control during construction.

- **Biological Resources** - Even though the sites have been previously disturbed, both the construction sites and the areas suited for power equipment must be surveyed for endangered species as well as for raptors and migratory birds. During the consideration of the Nestle project, a number of bats were observed on the site and measures designed to ensure their protection during construction of the facility. It is reasonable to assume that similar surveys may result in similar mitigation for either site. Given the amount of land available and the small area of the facility, we recommend avoiding any wetlands. Avoiding wetlands will save the cost and time of wetland delineation. Finally, depending on the timing of the IS/MND and the eventual construction, it is reasonable to assume preconstruction surveys would be required as mitigation. While this is a common mitigation measure, compliance with the mitigation may affect the cost and timing of construction. Either site would require minimum in-stream flows at Squaw Creek of 600 gpm in order to satisfy US Fish and Wildlife Service requirements, which is viable.

- **Greenhouse Gas Emissions** - Similar to air quality, the main impact associated with this issue will be during construction. Operation of the facility would result in a net reduction of greenhouse gases that helps with implementation of AB 32. The CEQA IS/MND would provide an evaluation

[2] Mark Teague, with PMC, was consulted during the drafting of the Preliminary Analysis report. PMC has completed past CEQA analysis for MCSD and is familiar with the project attributes. PMC's estimated costs for an IS/MND effort have been included in the estimated project costs.

and determination of the GHG emissions from the project consistent with the CEQA checklist.

- **Preparation, Public Review and Comment** - The IS/MND will need to cover all the rest of the items on the CEQA checklist and provide detailed information as to how the project would address the potential impacts. This document would then be circulated for at least 30 days for public review. The public review process involves local, state, and federal agencies as well as the general public. As part of the public review process, the District is likely to receive public comments. While not required, it is convention to respond to the comments before taking action to approve the project.

- **Timing** - The biological analysis is season dependent and must be completed when appropriate for the various species involved, which is usually during the spring and early summer. The rest of the technical analysis can be completed once the project description has been refined. With the technical studies complete, an IS/MND takes approximately four weeks to draft, two weeks to review, and two weeks to correct and publish. This effort is followed by four weeks of public review. Following the public review period, it usually takes three weeks to respond to comments before the District could take action on the project. Overall, a safe planning estimate would be 16–18 weeks from notice to proceed until the ability to take action on the IS/MND

Water Rights

MCSD possesses pre-1914 consumptive water rights for both flows emanating from Intake, Lower and Upper Elk Springs. The existing water right may require the addition of hydropower generation language in order to comply with renewable generator designations

Task 5: Permitting:

Federal Energy Regulation Commission (FERC) hydropower licensing

FERC has jurisdiction on all hydroelectric facilities that generate power within the United States for navigable waters. Given that the source of water is "non-navigable" (groundwater) from Intake Spring, we assess that the project does not require FERC approval and no further action is necessary. Should the District require additional assurances, a letter describing the project can be sent to FERC hydropower licensing division. FERC should reply that the site is not subject to FERC jurisdiction

Local Permits

California Government Code Section 53091 exempts public agencies from local county and/or city permits, encroachment permits, air quality permits, storm water pollution prevention plans, and construction easements.

Task 6: Proposal Monitoring Plan:

Water and pressure meters will verify that the new 18-inch pipeline is delivering the full allotment of flow to the hydroelectric station. The hydroelectric turbine-generator systems will contain flow, pressure and power metering that will be controlled by PLC and viewed through an on-line viewing tool. A third-party Performance Data Provider will verify monthly generation and report to the California Energy Commission through the Western Renewable Energy Generation Information System (WREGIS).

Task 7: Project Construction/Implementation:

MCSD will utilize a Design-Bid-Build structure to implement the project. The Design, Engineering, Project Management and Permitting function will be outsourced to a consultant. It is expected that the Design function will be sole sourced in accordance with California Code Section 4217. This section allows Public Agencies to directly negotiate with a Qualified Energy Service Provider to design and build a "Self Funding" energy project.

The construction portion of the project will go through the bid process. It is important to go through a bid process for the construction portion of the project because it typically accounts for the majority share of the project cost (>70-percent) and this allows for MCSD to keep the overall project cost low. The Design-Bid-Build development offers MCSD the most cost-effective and timely method to develop the project, while producing the most cost-competitive construction bids.

The Design-Bid-Build process begins with a final design, interconnection approval, completed and filed CEQA and a FERC NOI. Once these milestones have been met, the project will fall into these main construction categories:

- Construction Contracting: This step will include a formal announcement of the construction bid as set forth in the initial set of bid documents. General Contractors will be offered an opportunity for a pre-bid site walk and conference as well as a Request-for-Information period to request clarification about the project. The bidding procedure will be run in accordance with California Public Contracting law. The best value bid will be screened and reviewed by NLine Energy and the bid results will be forwarded to the MCSD Board for consideration and adoption. Once adopted,

the winning bidder will be notified, as well as the non-winning bidders.

- Mobilization Period: The winning bidder will post surety and performance bonds at contract signing. The general contractor will begin with submittals and any remaining requests for information after a notice to proceed is received. Finally, the general contractor will begin staging equipment, materials and tools at the project site.

- Construction Period: The general contractor will have daily inspection reports for civil, mechanical and electrical issues from a third-party inspection firm to include a review of engineering drawings, photographs and sketches. NLine Energy will conduct weekly construction meetings where the general contractor will review the work that has been completed and a three-week look-ahead schedule will be reviewed. The weekly construction meetings will also review the environmental mitigation, safety plan, communication plan, outstanding RFIs/submittals, unscheduled delays and claims. Costs, materials and expected prices have been outlined in the "Project Cost" section.

- Commissioning Period: The general contractor will be present during the commissioning of the project in order to ensure that the project is constructed to the specification and any changes have been properly reviewed, approved and documented.

- De-Mobilization: The general contractor will demobilize from the site, by removing all extra, equipment, materials and tool from the project site. Final release will be issued by MCWD that the work is complete.